REMARKS

Claims 1-50 were pending in the application. Claims 34 and 36 have been cancelled without prejudice and new claims 51 and 52 have been added in order for Application to more fully claim what he regards as his invention.

I. CLAIM AMENDMENTS.

Claims 1, 6, 8-11, 16, 18, 22-23 and 49 have been amended in order to correct minor typographical errors and also to maintain consistency in the use of claim terms. None of the amendments have the effect of narrowing claims 1, 6, 8-11, 16, 18, 22-23 and 49, nor were they made for a reason related to patentability. Accordingly, no subject matter is surrendered by such amendments, particularly with respect to the operation of the doctrine of equivalents.

Claim 24 was amended to incorporate the limitations of cancelled claims 34 and 36. Claim 24 was narrowed with respect to the lower concentration limit for oxygen contained in the composition (from 20% to 25% by weight of the glass composition) but broadened with respect to the upper concentration limits for phosphorus and oxygen, which were removed.

II. NEW CLAIMS.

New claim 51 is derived from original claims 1 and 10, except that it is a composition, rather than a use, claim.

New claim 52 is derived from original claims 1, 5 and 6, except that it is a composition, rather than a use, claim.

III. COMMENTS REGARDING INTERNATIONAL PRELIMINARY EXAMINATION REPORT.

According to the International Preliminary Examination Report, claims 1-20 are both novel and define an inventive step with respect to the following art discovered in the International Search Report:

D1: Japan App. No. 01 219038 A (Chem. Abs., vol. 112, no. 20)

D2: Soviet Union App. No. 313 794 A (Chem. Abs. vol. 76, no. 2)

D3: U.S. Patent No. 4,285,730 to Sanford et al.

D4: U.S. Patent No. 5,360,770 to Chadwick

D5: Europe App. No. 0 509 516 (Sankin Ind. Co.)

D6: Europe App. No. 0 797 975 A (Sankin Ind. Co.)

In making this assessment the Examination Report states the following:

> Documents D1-D3 disclose glass compositions falling within the definition given in claims 1 or 18 but are not concerned with dental treatment. Documents D4-D6 disclose glass compositions for dental applications but their compositions differ from those defined in claims 1 or 18. In particular, the compositions contain less phosphorus. The problem solved by the application is "how to provide improved fluoride releasing glass compositions for use in the treatment of caries". There is no indication in the closest prior art (D4-D6) which would cause a person skilled in the art to modify the glass compositions disclosed therein in order to arrive at the solution provided by the invention.

Applicant agrees with the Examination Report insofar that claims 1-20 are novel and nonobvious with respect to references D1-D6, that D1-D3 do not teach or suggest the use of the compositions disclosed therein for dental treatments of any kind, and that D4-D6 do not teach or suggest the compositions recited in claims 1-20. Applicant disagrees, however, with the statement

that "D1-D3 disclose glass compositions falling within the definition given in claims 1 or 18." Upon review of the references, it is seen that D2 and D3 fail to teach or suggest the glass compositions recited in claims 1 and 18.

SU 313 794 A (D2) discloses a composition that contains less than the claimed amount of phosphorus (P) in either of claims 1 or 18, both of which recite the inclusion of 16-24% by weight phosphorus on an emperical basis within the glass composition. In contrast, D2 discloses the use of only 6.56-10.93% phosphorus. This range is arrived at by noting that D2 discloses, as the only phosphorus source, P_2O_5 in the amount of 15-25%. Because phosphorus has a molecular weight of 31 and oxygen has a molecular weight of 16, it is apparent that P_2O_5 contains 43.7% by weight phosphorus. That means that a composition that contains 15-25% P_2O_5 contains 6.56-10.93% phosphorus. Thus, the statement in the Examination Report that D2 "disclose[s] glass compositions falling within the definition given in claims 1 or 18" is believed to be incorrect. Moreover, because claim 24 requires at least 16% by weight phosphorus it appears to be neither anticipated by nor obvious over D2. Similar reasoning applies to new claims 51 and 52.

U.S. Patent No. 4,285,730 to Sanford et al. (D3) discloses a composition that contains less than the claimed amount of fluoride (F) in either of claims 1 or 18, both of which recite the inclusion of 5-30% by weight fluoride on an emperical basis within the glass composition. In contrast, D3 teaches that the glass compositions disclosed therein contains "about 0.3-3% by weight F, as analyzed in the final glass." Col. 2, *ll.* 12-13. Thus, the statement in the Examination Report that D3 "disclose[s] glass compositions falling within the definition given in claims 1 or 18" is believed to be incorrect. Moreover, because claim 24 requires at least 5-30% by weight fluoride it appears to be neither anticipated by nor obvious over D3. Similar reasoning applies to new claims 51 and 52.

JP 01 219038 A (D1) discloses a composition that contains less oxygen than is required by claim 24, as amended, which claims the use of at least 25% by weight oxygen. D1 teaches the

criticality of using 8-40% by weight P_2O_5: "The glass will be unstable if the P_2O_5 content is less than 8%, but if 40% is exceeded the chemical resistance will suffer, so the amount of P_2O_5 is limited to between 8 and 40%." Page 4, next to last paragraph, of translation. As shown above, P_2O_5 contains 43.7% by weight phosphorus, which means that it contains 57.3% by weight oxygen. That means that a composition that contains 8-40% by weight P_2O_5 contains 4.6-22.9% by weight oxygen. Because D1 teaches the criticality of including no more than 40% by weight P_2O_5, which contains 57.3% oxygen, D1 teaches away from the use of more than 22.9% by weight oxygen since P_2O_5 is the only significant source of oxygen within the glass disclosed in D1. Thus, claim 24 as amended is believed to be neither anticipated by nor obvious over D1.

In the alternative, new claim 51 recites the inclusion of 18-23% by weight phosphorus. As shown above, P_2O_5 contains 43.7% phosphorus. That means that a composition that contains 8-40% by weight P_2O_5 contains 3.5-17.5% phosphorus. Because D1 teaches the criticality of including no more than 40% by weight P_2O_5, which contains 43.7% phosphorus, D1 teaches away from the use of more than 17.5% by weight phosphorus since P_2O_5 is the only source of phosphorus within the glass disclosed in D1. Thus, claim 51 is believed to be neither anticipated by nor obvious over D1.

In the alternative, new claim 52 recites the inclusion of "at least one of calcium, magnesium, or zinc in an amount of up to a total of 10% by weight." D1 teaches the use of 30-75% by weight of RF_2 (wherein R is selected from barium, strontium, calcium, magnesium or zinc). Based on the molecular weights of calcium, magnesium, zinc and fluoride, the inclusion of 30-75% by weight of one or more of calcium, magnesium or zinc fluoride results in a combined calcium, magnesium and zinc content that is significantly greater than the maximum of 10% by weight recited in claim 52. Thus, claim 52 is believed to be neither anticipated by nor obvious over D1.

V. CONCLUSION.

In the event that the Examiner finds any remaining impediment to the prompt allowance of this application, which could be clarified by a telephonic interview, or which is susceptible to being overcome by means of an Examiner's Amendment, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE**".

Dated this 10th day of June 2002.

Respectfully submitted,

John M. Guynn
Attorney for Applicant
Registration No. 36,153

WORKMAN, NYDEGGER & SEELEY
1000 Eagle Gate Tower
60 East South Temple
Salt Lake City, Utah 84111
Telephone: (801) 533-9800
Facsimile: (801) 328-1707

JMG:cm
G:\WPDOCS2\MTG\JMG\ULTRADEN\PATENTS\576A1.AMB

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 34 and 36 have been cancelled without prejudice.

Claims 1, 6, 8-11, 16, 18, 22-24 and 49 have been amended as follows:

1. (Twice Amended) Use of a glass composition for the treatment and/or prevention of dental caries, the glass composition comprising the general empirical formula given below, expressed in weight percent of each element:

P: 16-24
F: 5-30
O: 20-40

and at least one of Na, K, Li or Al in an amount up to a total of 40 [wt.]% by weight.

6. (Twice Amended) Use of a glass composition as claimed in claim 4, wherein the one or more other glass modifiers are included in an amount of up to 10 [wt.]% by weight.

8. (Twice Amended) Use of a glass composition as claimed in claim 1, wherein aluminum is included in the glass composition in an amount of at least 3 [wt.]% by weight.

9. (Twice Amended) Use of a glass composition as claimed in claim 1, wherein at least 25 [wt.]% by weight oxygen is included in the glass composition.

10. (Twice Amended) Use of a glass composition as claimed in claim 1, wherein the phosphorus is included in an amount of 18-23 [wt.]% by weight.

11. (Twice Amended) Use of a glass composition as claimed in [Twice] claim 1, wherein at least 12 [wt.]% by weight of fluoride is included in the glass composition.

16. (Twice Amended) Use of a glass composition as claimed in claim 15, wherein the dental restorative material is selected from the group consisting of dental amalgams, [Twice] twice fissure sealant resins, and composite bonding materials.

18. (Twice Amended) A method for the treatment and/or prevention of dental caries, the method comprising attaching a glass composition to a tooth to provide a fluoride releasing device, the glass composition comprising the general empirical formula given below, expressed in weight percent of each element:

P: 16-24
F: 5-30
O: 20-40

and at least one of Na, K, Li or Al in an amount up to a total of 40 [wt.]% by weight.

22. (Amended) Use of a glass composition as claimed in claim 21, wherein the boron or silicon are included in an amount up to 5 [wt.]% by weight.

23. (Amended) A method for the treatment and/or prevention of dental caries as claimed in claim 18, wherein the glass composition further includes at least one of boron or silicon in an amount up to 5 [wt.]% by weight.

24. (Amended) A glass composition suitable for use in treating or preventing dental caries comprising, on an [the general] empirical basis, [formula given below, expressed in weight percent of each element:] at least 16% by weight phosphorus, at least 25% by weight oxygen, 5-30% by weight fluoride,

[P: 16-24
F: 5-30
O: 20-40]

and at least one of [Na, K, Li or Al] sodium, potassium, lithium or aluminum in an amount up to a total of 40 [wt.]% by weight.

49. (Amended) A glass composition as claimed in claim 48, wherein the boron or silicon are included in an amount up to 5 [wt.]% by weight.

New claims 51 and 52 have been added as follows:

51. (New) A glass composition suitable for use in treating or preventing dental caries comprising, on an empirical basis, 18-23% by weight phosphorus, 20-40% by weight oxygen, 5-30% by weight fluoride, and at least one of sodium, potassium, lithium or aluminum in an amount up to a total of 40% by weight.

52. (New) A glass composition suitable for use in treating or preventing dental caries comprising, on an empirical basis, 16-24% by weight phosphorus, 20-40% by weight oxygen, 5-30% by weight fluoride, at least one of sodium, potassium, lithium or aluminum in an amount up to a total of 40% by weight, and at least one of calcium, magnesium, or zinc in an amount of up to a total of 10% by weight.